NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION

COUNTIES OF GASTON, CATAWBA,
AND RUTHERFORD

IN THE MATTER OF	)	
NORTH CAROLINA	)	SPECIAL ORDER BY CONSENT
NPDES PERMITS NC0004979, NC0004987	)	EMC SOC WQ S17-009
& NC0005088	)	
	)	
HELD BY	)	
DUKE ENERGY CAROLINAS, LLC	)	

Pursuant to the provisions of North Carolina General Statutes (G.S.) 143-215.2, this Special Order by Consent is entered into by Duke Energy Carolinas, LLC, hereinafter referred to as Duke Energy, and the North Carolina Environmental Management Commission, an agency of the State of North Carolina created by G.S. 143B-282, and hereinafter referred to as the Commission. Duke Energy and the Commission are referred to hereafter collectively as the "Parties."

1. **Stipulations**: Duke Energy and the Commission hereby stipulate the following:

   a. This Special Order by Consent ("Special Order") addresses issues related to the elimination of seeps (as defined in subparagraphs e, f, and g below) from Duke Energy's coal ash basins during the separate and independent process of basin closure under the Coal Ash Management Act, G.S. 130A-309.200 through 130A-309.231 ("CAMA") and the Federal Coal Combustion Residuals Rule, 40 CFR Parts 257 and 261. The Environmental Protection Agency first directed permitting authorities to consider potential impacts on surface water of seeps from earthen impoundments in 2010. At that time, Duke Energy began discussions with the North Carolina Department of Environmental Quality ("the Department") regarding seeps at multiple Duke Energy facilities, including identifying certain seeps in permit applications and providing data to the Department regarding seeps. In 2014, Duke Energy provided a comprehensive evaluation of all areas of wetness and formally applied for NPDES permit coverage of all seeps. Since 2014, Duke Energy has performed periodic inspections and promptly notified the Department of new seeps and sought NPDES permit coverage where appropriate. On March 4, 2016, the Department issued Notices of Violation ("NOVs") to Duke Energy related to seeps.

Decanting (i.e., removal of the free water on the surface of the coal ash basins), which is required before ash basins can be closed, is expected to substantially reduce or eliminate the seeps. In order to accomplish this goal of substantially reducing or eliminating seeps, this Special Order affords certain relief to Duke Energy related to the non-engineered seeps (as defined in subparagraphs f and g below), while requiring Duke Energy to accelerate the schedule for decanting as specified more fully below. Engineered seeps (as defined in subparagraphs e and f below) will be addressed in the NPDES permits. After completion of decanting, for any remaining seeps, whether engineered or non-engineered, Duke Energy must take appropriate corrective action as specified more fully below.

b. Duke Energy has been issued North Carolina NPDES permits for operation of an existing wastewater treatment works at each of the following coal fired, electric generation facilities ("Duke Energy Facilities," or in the singular, "Facility"):

Facility	Permit Number	County	Issuance Date	Receiving Water for Primary Outfall
Allen	NC0004979	Gaston	1/18/2011	Catawba River
Marshall	NC0004987	Catawba	9/9/2016	Catawba River
Rogers	NC0005088	Rutherford	2/20/2012	Broad River

c. The Duke Energy Facilities listed above will continue to operate and generate coal ash, and each is subject to the provisions of this Special Order.

d. Wastewater treated at coal-fired electric stations includes water mixed with ash produced through the combustion of coal for the steam generation process. Ash is controlled and collected through the use of water, creating a slurry that is conveyed to impoundments or basins with earthen dike walls. In the ash basin, the solids separate from the liquid portion, with the resulting supernatant discharged under the terms of the NPDES permit.

e. The coal ash basins at the Duke Energy Facilities are unlined, having no impermeable barrier installed along their floors or sides. Earthen basins and dike walls are prone to the movement of liquid through porous features within those structures through a process known as seepage. Each of the Duke Energy Facilities covered by this Special Order exhibits locations adjacent to, but beyond the confines of, the coal ash basins where seepage of coal ash wastewater from the coal ash basins may intermix with groundwater, reach the land surface (or "daylight"), and may flow from that area. Once such seepage reaches the land surface, it is referred to as a "seep." Each of the seeps identified at the Duke Energy Facilities and addressed in this Special Order exhibit some indication of the presence of coal ash wastewater. Both (a) confirmed seeps and (b) areas identified as potential seeps that were later dispositioned, are identified in Attachment A.

f. Some of Duke Energy's coal ash impoundments contain engineered features on or within the dam structures (such as toe drains or filter blankets) to collect seepage. This wastewater is conveyed via a pipe or an engineered channel directly to a receiving water. These discrete, identifiable, point source discharges are or will be covered and regulated by the respective NPDES permits and designated as outfalls therein. The characteristics of these wastewater flows are similar to those discharging from other permitted outfalls for ash basin effluent. In this Special Order, such features are referred to as "engineered seeps." Seeps that do not convey wastewater via a pipe or engineered channel directly to a receiving stream are referred to as "non-engineered seeps."

g. Non-engineered seeps at the Duke Energy Facilities often exhibit low flow volume and may be both transient and seasonal in nature, and may, for example, manifest as an area of wetness that does not flow to surface waters, a point of origin of a stream feature, or flow to an existing stream feature. These circumstances of the non-engineered seeps make them difficult to discern, characterize, quantify and/or monitor as discrete point source discharges. This creates challenges in permit development and compliance monitoring because it is difficult to accurately monitor for flow and discharge characterization. Non-engineered seeps at the Duke Energy Facilities present significant challenges to their inclusion in NPDES permits as point source discharges, but they do cause or contribute to pollution of classified waters of the State. Therefore, these non-engineered seeps are addressed in this Special Order rather than in an NPDES permit.

h. Investigations and observations conducted by the Department and U. S. Army Corps of Engineers staff have concluded that some seeps emanating from Duke Energy's coal ash ponds create and/or flow into features delineated as classified waters of the State or Waters of the United States.

i. Collectively, the volume of non-engineered seeps is generally low compared to the volume of permitted wastewater discharges at the Duke Energy Facilities.

j. In 2014, Duke Energy conducted a survey of each coal-fired electric generation station to identify potential seeps from the coal ash surface impoundments. Duke Energy included all areas of wetness identified around the impoundments as seeps, and submitted applications to include those seeps in NPDES permits. Beginning in 2015, Duke Energy has implemented semi-annual surveys to identify new seeps in the vicinities of the coal ash basins. Additional seeps have been observed and documented during these surveys and reported to the Department pursuant to a Discharge Identification Plan mandated by CAMA. Additional investigation has determined that not all of areas identified in 2014 are seeps, but each Duke Energy facility does have multiple seeps.

k. The Department issued NOVs to Duke Energy on March 4, 2016 for the seeps that emanate from the unlined coal ash surface impoundments at the Duke Energy Facilities.

l. Non-engineered seeps create conditions such that certain surface water quality standards may not consistently be met at all Duke Energy monitoring sites.

m. The presence of coal ash influenced water in the non-engineered seeps causes or contributes to pollution of the waters of this State, and Duke Energy is within the jurisdiction of the Commission as set forth in G.S. Chapter 143, Article 21.

n. A list of seeps identified in the vicinities of the coal ash surface impoundments at the Allen, Marshall and Rogers plants, as well as their locations, and the bodies of water those seeps may flow into (if applicable), can be found in Attachment A to this Special Order.

o. Duke Energy must close the coal ash surface impoundments at all North Carolina coal-fired electric generating stations in accordance with applicable requirements set out in CAMA and the Federal Coal Combustion Residuals Rule, requirements of which are independent of the resolution of seeps addressed in this Special Order.

p. Decanting of wastewater performed at Duke Energy's coal ash basins is expected to eliminate or substantially reduce the seeps from the ash basins at the Duke Energy Facilities.

q. Since this Special Order is by consent, the Parties acknowledge that review of the same is not available to the Parties in the N.C. Office of Administrative Hearings. Furthermore, neither party shall file a petition for judicial review concerning the terms of this Special Order.

2. Duke Energy, desiring to resolve the matters causing or contributing to pollution of the waters of the State described above, hereby agrees to do the following:

a. **Penalties**

1) **Upfront Penalty.** Pay the Department, by check payable to the North Carolina Department of Environmental Quality, a penalty in the amount of $84,000, calculated based upon $4,000 each for 21 seeps identified prior to January 1, 2015. No penalty shall be assessed for seeps identified after December 31, 2014, given Duke Energy's inclusion of seeps in permit applications and compliance with the Discharge Identification Plan required under CAMA. The payment of penalties in this Special Order related to issues arising prior to 2015 is not an admission or result of any wrongdoing or evidence of mismanagement, negligence, imprudence, or final determination of violations of laws, rules or standards by Duke Energy and is instead an agreed-to condition required by DEQ as consideration for this Special Order.

A certified check in the amount of $84,000.00 must be made payable to the Department of Environmental Quality and sent to the Director of the Division of Water Resources (DWR) at 1617 Mail Service Center, Raleigh, North Carolina 27699-1617 by no later than thirty (30) days following the date on which this Special Order is approved and executed by the Commission, and received by Duke Energy.

2) **Stipulated Penalties.** Duke Energy agrees that unless excused under paragraph 5, Duke Energy will pay the Department, by check payable to the North Carolina Department of Environmental Quality, stipulated penalties according to the following schedule for failure to perform activities described in paragraphs 2(b, c, and d), or for failure to comply with interim action levels listed in Attachment A.

Failure to meet a deadline in the Compliance Schedule in 2(b) of this Special Order	$1,000.00/day for the first seven days; $2,000.00/day thereafter
Failure to meet any other deadline in this Special Order	$1,000.00/day for the first seven days; $2,000.00/day thereafter
Exceedance of an interim action level listed in Attachment A	$4,500.00 per monitored exceedance
Monitoring frequency violations	$1,000.00 per violation
Failure to submit, within 210 days of the completion of decanting at each Facility, adequate amendments to groundwater Corrective Action Plans or Closure Plans to address all remaining seeps, whether engineered or non-engineered, through corrective action as applicable under paragraph 2(d) of this Special Order.[1]	$5,000.00 per day, to a maximum of $1,000,000.00 per electric generating facility.

As long as Duke Energy remains in compliance with the terms of this Special Order, as well as CAMA and conditions of any approvals issued thereunder, the Department shall not assess civil penalties for newly identified seeps.

b. **Compliance Schedule.** Duke Energy shall undertake the following activities in accordance with the indicated time schedule. No later than fourteen (14) calendar days after any date identified for accomplishment of any activity, Duke Energy shall submit to the Director of DWR written notice of compliance or noncompliance therewith. In the case of compliance, the notice shall include the date compliance was achieved along with supporting documentation if applicable. In the case of noncompliance, the notice shall include a statement of the reason(s) for noncompliance, remedial action(s) taken, and a statement identifying the extent to which subsequent dates or times for accomplishment of listed activities may be affected.

Duke Energy shall accelerate compliance with the requirements of G.S. 130A-309.210(d) and (f) such that all projects necessary to eliminate discharges of stormwater into the surface impoundments at the Duke Energy Facilities and to convert to dry bottom ash handling shall be complete prior to the deadline for initiating decanting set out below.

1) **Complete dry ash handling projects in accordance with the following schedule**

[1] Failure to adequately implement any amended Corrective Action Plan or Closure Plan will be handled in the normal course.

Facility	Fly Ash	Bottom Ash
Allen	Complete	3/31/2019
Marshall	Complete	1/31/2019
Rogers	3/31/2018	8/31/2018

2) **Initiation of Decanting**

Allen	6/30/2019
Marshall	9/30/2019
Rogers	3/31/2019

3) **Completion of Decanting**

Allen	6/30/2020
Marshall	3/31/2021
Rogers	3/31/2020

This schedule is premised upon timely issuance of necessary permits or approvals, and no requirement imposed by DWR to implement physical/chemical treatment during decanting except as required by an NPDES permit. Should any of these assumptions prove to be incorrect, the Parties shall renegotiate these deadlines, provided that the final expiration date of this Special Order will not be affected by such renegotiation.

4) **Termination of Special Order**

This Special Order shall terminate on a facility-by-facility basis on the later of the following dates:

- 180 days following completion of decanting; or
- 30 days following the approval of an amended groundwater Corrective Action Plan and/or Closure Plan as appropriate (if an amendment is submitted in compliance with subparagraph d. below).

c. **Additional Compliance Measures.** Duke Energy shall undertake the following additional compliance measures:

1) If the monitoring of any classified water of the State receiving flow from seeps regulated by this Special Order indicates exceedance of any interim action level established by the Special Order, Duke Energy shall increase monitoring at that location from quarterly to monthly until concentrations of monitored characteristics return to those observed at the initiation of the Special Order. If any interim action level established by the Special Order is exceeded by more than 20% in a single sampling event, or exceeded for two (2) consecutive monitoring events, in addition to paying the associated stipulated penalty, Duke Energy shall conduct a re-assessment of the contributing seep(s), including, but not limited to, evaluation of proposed remedial actions for treatment and/or control of the seep such that impacts to the receiving waters are quickly mitigated. A report compiling the findings of the re-assessment, including proposed remedial actions, shall be provided to the Director of DWR within 60 days of any applicable exceedance. Following its review, DWR shall notify Duke Energy of its concurrence or disapproval of Duke Energy's proposed remedial actions.

2) Once the decanting process is initiated, within thirty (30) days after the end of each quarter, Duke Energy shall provide reports on the status of decanting work and other activities undertaken with respect to closure of each coal ash surface impoundment to DWR. The quarterly reports are due by April 30, July 30, October 30 and January 30 while this Special Order is in effect. The reports are to be submitted as follows: one copy must be mailed to the appropriate Regional Office Supervisor for each facility and one copy must be mailed to the Water Quality Permitting Program, Division of Water Resources, 1617 Mail Service Center, Raleigh, NC 27699-1617.

3) Duke Energy shall conduct annual comprehensive surveys of areas down gradient of ash basins identifying new seeps, and documenting the physical characteristics of previously documented seeps. All examinations of seeps must include identification of seeps by approximate latitude and longitude and date-stamped digital photographs of their appearance. A report summarizing the findings of the surveys, including a section analyzing the effect decanting of the basin(s) has on seep flows, accompanied by copies of the photographs noted above ("Annual Seep Report"), shall be submitted to DWR in conjunction with submittal of the April 30 quarterly report noted in 2(c)(2) above. This Annual Seep Report must list any seep that has been dispositioned (as described below) during the previous year, including an analysis of the manner of disposition. For purposes of this Special Order, "dispositioned" includes the following: (1) the seep is dry for at least three consecutive quarters; (2) the seep does not constitute, and does not flow to, waters of the State or Waters of the United States for at least three consecutive quarters; (3) the seep is no longer impacted by flow from any coal ash basin such that concentrations of all pollutants listed in Attachment B meet State criteria for four consecutive sampling events with at least seven days separating each event; or (4) the seep has been otherwise eliminated (e.g., through an engineering solution). If a seep that has been dispositioned through drying up reappears in any subsequent survey, such a seep will no longer be deemed dispositioned and can be subsequently re-dispositioned as specified above.

4) No later than 90 days following the completion of decanting at each Facility, and in the same manner as in the annual surveys, Duke Energy shall conduct a comprehensive survey of areas down gradient of ash basins identifying new seeps, and documenting the physical characteristics of previously documented seeps. All examinations of seeps must include identification of seeps by approximate latitude and longitude and date-stamped digital photographs of their appearance. A report summarizing the findings of this survey, including a section analyzing the effect decanting of the basin(s) has had on seep flows, accompanied by copies of the photographs noted above, shall be submitted to the Director of DWR ("Final Seep Report"). This Final Seep Report must list any seep that has been dispositioned (as described in subparagraph (3) above) during decanting process, including an analysis of the manner of disposition. The determination of whether a seep is dispositioned rests with the Director of DWR. At, or at any time prior to, submission of the Final Seep Report, Duke Energy shall seek formal certification from the Director of DWR, certifying the disposition of any seep that Duke Energy has characterized as dispositioned. Any seeps not certified as dispositioned by the Director of DWR shall not be deemed as dispositioned.

d. **Further Corrective Action**. Following completion of decanting, if any seeps (including both engineered and non-engineered seeps) have not been certified by the Director of DWR as dispositioned (as described in subparagraph c. above), Duke Energy shall conduct a characterization of those seeps.[2] Duke Energy shall submit a report on the findings of these characterizations ("Seep Characterization Report") to the Director of DWR within 150 days of completion of decanting at each Facility (i.e., within 60 days of the submittal of the Final Seep Report). The Seep Characterization Report must include all sampling data for each remaining seep as well as Duke Energy's evaluation of the jurisdictional status of all seeps at the relevant Facility. The determination regarding whether a surface water feature is a classified water of the State rests with DWR.

Within 60 days of the submittal of the Seep Characterization Report, Duke Energy shall submit a complete and adequate proposed amendment to the groundwater Corrective Action Plan and/or Closure Plan as appropriate for the Facility describing how any seeps identified in the Seep Characterization Report will be managed in a manner that will be sufficient to protect public health, safety, and welfare, the environment, and natural resources. This proposed amendment will go to public comment. Duke Energy shall submit documentation that the proposed modification has been submitted to the appropriate division within the Department that has authority for approving modification of the groundwater Corrective Action Plan and/or Closure Plan. The content of, and DEQ's review of, an amendment to a groundwater Corrective Action Plan shall be consistent with Title 15A, Chapter 2L of the N.C. Administrative Code (specifically including 2L.0106(h)-(o)). The amendment to the Corrective Action Plan and/or Closure Plans shall be implemented by Duke Energy in accordance with the deadlines contained therein, as approved or conditioned by the Department. Failure by Duke Energy to implement the amendment will be handled in the normal course by the Department in accordance with its enforcement procedures (i.e., outside this Special Order).

[2] If any seep is dispositioned between the time that the Final Seep Report is submitted and the time the Seep Characterization Report is submitted, an analysis of the manner of disposition must be included in the Seep Characterization Report, and Duke Energy must seek certification of such a disposition from the Director of DWR. Only if such certification is received prior to the due date of the proposed amendment described in paragraph 2(d) may such a seep, certified as dispositioned, be omitted from the proposed amendment.

For clarity, listed below is a summary of the timetable for the documents due after completion of decanting (as described in 2(c)(4) and 2(d) above):

Document	Due Date
Final Seep Report	90 days after completion of decanting
Seep Characterization Report	150 days after completion of decanting (i.e., 60 days after submission of Final Seep Report)
Proposed amendment to groundwater Corrective Action Plan and/or Closure Plan	210 days after completion of decanting (i.e., 60 days after submission of Seep Characterization Report)

e. **Interim Action Levels.**

1) Duke Energy shall perform representative monitoring of waters receiving flow from non-engineered seeps in accordance with the schedules listed in Attachments A and B, except as noted in paragraph 2(c)(1) above.

2) Upon the complete execution of this Special Order, with regard to non-engineered seeps, interim action levels for the receiving waters which are minor tributaries are hereby established as noted in Attachment A. The interim action levels are site-specific. Duke Energy shall monitor at approved sampling sites to ensure interim action levels are met. Interim action levels shall remain effective in the designated surface waters until the applicable termination date in paragraph 2(b)(4) is reached.

3) Monitoring associated with seeps covered by this Special Order is exempt from the electronic reporting requirements associated with NPDES permits. Results of monitoring required exclusively per the terms of this Special Order shall be reported to the Director of DWR in a spreadsheet/worksheet format agreed to by Duke Energy and DWR. Monitoring data shall be submitted to the Director of DWR in a digital format no later than 30 days following the end of each calendar quarter for as long as the Special Order is in effect. Monitoring data shall be sent to the following email address: desocdata@ncdenr.gov. Data from those sites with monitoring required exclusively per the terms of the Special Order will be posted on DWR's website to provide the public with the opportunity for viewing.

3. Duke Energy will continue to operate its coal ash surface impoundments in such a manner that their performance is optimized, and potential for surface waters to be affected by seeps is minimized.

4. Duke Energy shall make available on its external website the NPDES permits, this Special Order and all reports required under this Special Order for each of the Duke Energy Facilities no later than thirty (30) days following their effective or submittal dates.

5. Duke Energy and the Commission agree that the stipulated penalties specified in paragraph 2(a)(2) are not due if Duke Energy satisfies DWR that noncompliance was caused solely by:

   a. An act of God;

   b. An act of war;

   c. An intentional act or omission of a third party, but this defense shall not be available if the act or omission is that of an employee or agent of Duke Energy or if the act or omission occurs in connection with a contractual relationship with Duke Energy;

   d. An extraordinary event beyond the Duke Energy's control, specifically including any court order staying the effectiveness of any necessary permit or approval. Contractor delays or failure to obtain funding will not be considered as events beyond Duke Energy's control; or

   e. Any combination of the above causes.

6. Failure within thirty (30) days of receipt of written demand by DWR to pay the stipulated penalties, or challenge them by a contested case petition pursuant to G.S. 150B-23, will be grounds for a collection action, which the Attorney General is hereby authorized to initiate. The only issue in such an action will be whether the thirty (30) days has elapsed.

7. Any non-engineered seeps causing or contributing to pollution of waters of the State associated with the coal ash impoundments at Duke Energy's Allen, Marshall and Rogers electric generation stations, and listed in Attachment A to this Special Order, are hereby deemed covered by this Special Order. Any newly-identified non-engineered seeps discovered during the annual investigations for seeps referenced in paragraph 2(c)(3) above, or at any other time while this Special Order is in effect, and timely reported to the Department per the terms of CAMA and this Special Order, shall be deemed covered by the terms of the Special Order, retroactive to the time of their discovery. Newly-identified non-engineered seeps must be sampled for the presence of those characteristics listed in Attachment B to this Order. Newly-identified non-engineered seeps found to be causing or contributing to pollution of the waters of the State, with the effect of causing a violation of water quality standards in surface waters not already referenced in the Special Order, may require modification of the Special Order to address those circumstances.

8. Noncompliance with the terms of this Special Order is subject to enforcement action in addition to the above stipulated penalties, including, but not limited to injunctive relief pursuant to G.S. 143-215.6C or termination of this Special Order by the Director of DWR upon ten (10) days' notice to Duke Energy. Noncompliance with the terms of this Special Order will not be subject to civil penalties in addition to the above stipulated penalties.

9. This Special Order and any terms or conditions contained herein, hereby supersede any and all previous Special Orders, Enforcement Compliance Schedule Letters, terms, conditions, and limits contained therein issued in connection with NPDES permits NC0004979, NC0004987 and NC0005088.

10. This Special Order may be modified at the Department's discretion, provided the Department is satisfied that Duke Energy has made good faith efforts to secure funding, complete all construction, and achieve compliance within the dates specified. In accordance with applicable law, modification of this Special Order will go to public notice prior to becoming effective.

11. Failure to pay the up-front penalty within thirty (30) days of execution of this Special Order will terminate this Special Order.

12. In addition to any other applicable requirement, each report required to be submitted by Duke Energy under this Special Order shall be signed by a plant manager or a corporate official responsible for environmental management and compliance, and shall include the following certification:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

13. This Special Order shall become effective in accordance with state law, and once effective, Duke Energy shall comply with all schedule dates, terms, and conditions herein.

This Special Order by Consent shall expire no later than June 30, 2022.

For Duke Energy Carolinas, LLC:

Paul Draovitch
Senior Vice President, Environmental, Health & Safety

1/8/19
Date

For the North Carolina Environmental Management Commission:

J. D. Solomon, P.E.
Chair of the Commission

Date

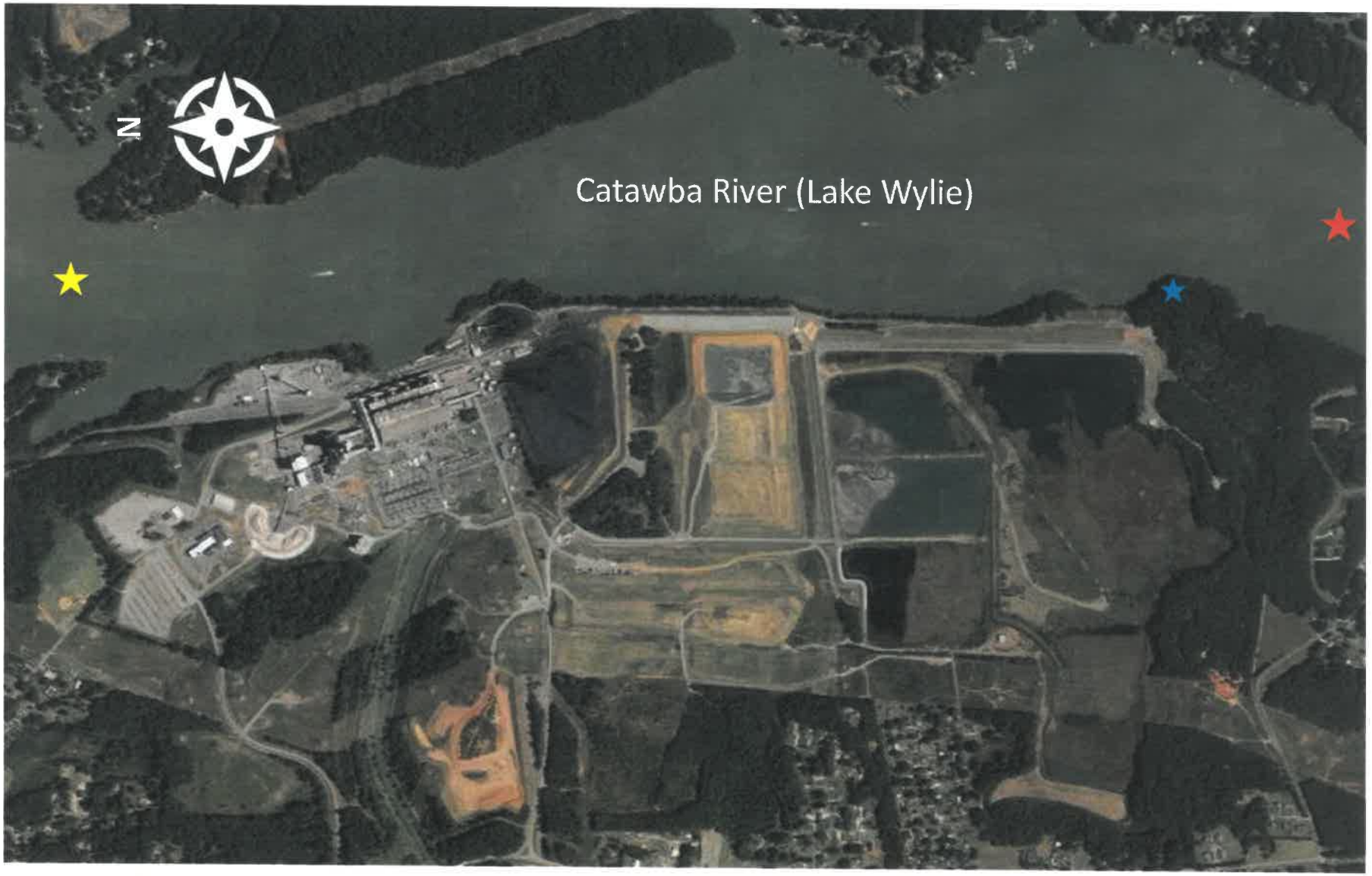
Attachment A
S17-009
Duke Energy Carolinas, LLC – Allen Steam Station, p.1

Non-Engineered Seeps

Seep ID Number	Approximate Location Coordinates		Description	Receiving Waterbody	Receiving Waterbody Classification	SOC Monitoring Requirements	Interim Action Level
	Latitude	Longitude					
S-1*	35.170632	-81.010093	Located south of active ash basin. Flow is in approximately 3 foot wide channel flowing southeast to Lake Wylie. Via sampling - No CCR impacts	Catawba River (Lake Wylie)	WS-V; B		
S-2	35.173761	-81.00578	Located south of the active ash basin at toe of dike. Flows to approximately 3 foot wide channel that flows to Lake Wylie.	Catawba River (Lake Wylie)	WS-V; B	Monitoring at point prior to entering Lake Wylie	pH 5-10 s. u. Hardness 400 mg/L
S-5	35.17698	-81.006087	Located east of active ash basin, between dike and river bank. Intermittent, unconfined diffuse flow towards Lake Wylie.	Catawba River (Lake Wylie)	WS-V; B	Instream Monitoring of Lake Wylie	
S-6	35.177049	-81.006128	Located east of active ash basin, between dike and river bank. Intermittent, unconfined diffuse flow towards Lake Wylie.	Catawba River (Lake Wylie)	WS-V; B	Instream Monitoring of Lake Wylie	
S-7	35.177736	-81.006334	Located east of active ash basin, between dike and river bank. Intermittent, unconfined diffuse flow towards Lake Wylie.	Catawba River (Lake Wylie)	WS-V; B	Instream Monitoring of Lake Wylie	
S-9**	35.185838	-81.00585	Former seep with flow through 24" corrugated metal pipe. Pipe has been grouted; discharge eliminated.	Catawba River (Lake Wylie)	WS-V; B		

*Location previously investigated as a seep. Monitoring has not indicated the presence of coal combustion residuals.
** Seep dispositioned via repair and/or non-flowing condition to potentially reach WOTUS, or other, as noted.
Monitoring shall be conducted at the approximate locations indicated on the attached site map.
All monitoring shall be conducted per the requirements found in Attachment B of this Order.

Allen Steam Station – Monitoring Locations



Upstream in Lake Wylie

Downstream in Lake Wylie

Representative Seep Monitoring

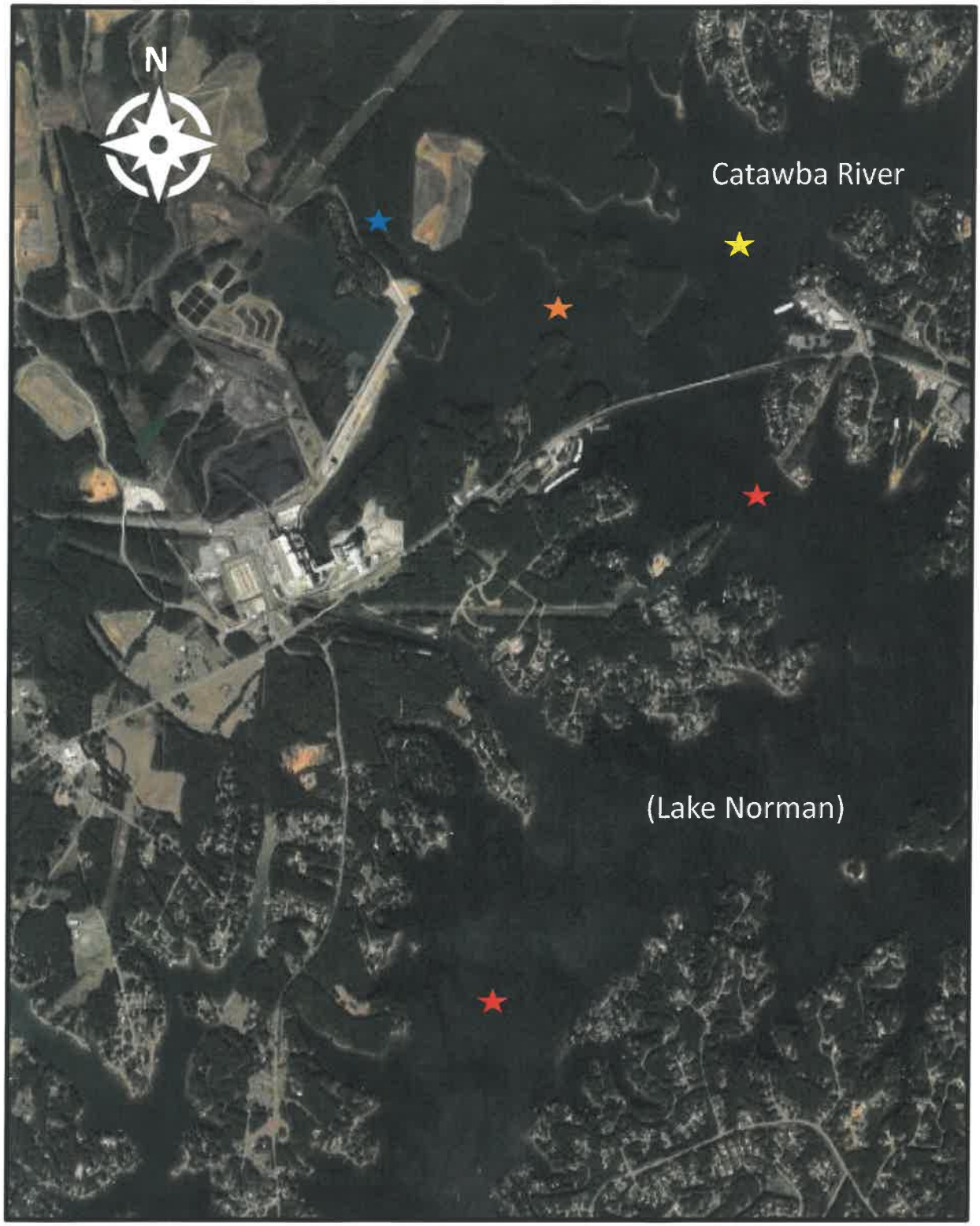
Attachment A
S17-009
Duke Energy Carolinas, LLC - Marshall Steam Station, p.1

Non-Engineered Seeps

Seep ID Number	Approximate Location Coordinates		Description	Receiving Waterbody	Receiving Waterbody Classification	SOC Monitoring Requirements	Interim Action Level
	Latitude	Longitude					
S-01	35.611722	-80.960389	General groundwater seepage forming a wet area that flows to an approximately 2 foot wide natural channel, located northeast of the active ash basin, then flows to Lake Norman.	Unnamed Tributary to Catawba River (Lake Norman)	WS-IV; B; CA	Monitoring at point prior to entering Lake Norman	pH 5-10 s. u. Hardness 200 mg/L
S-02	35.606642	-80.958931	Located east of active ash basin, minor area of wetness (AOW) between basin dike and river bank. Intermittent flow from culvert directs seasonal flow to Lake Norman.	Catawba River (Lake Norman)	WS-IV; B; CA	Instream Monitoring of Lake Norman	
S-03**	35.606714	-80.959059	Located east of active ash basin, minor area of wetness between basin dike and river bank. AOW was determined to be same area of wetness as AOW S-02 above.	Catawba River (Lake Norman)	WS-IV; B; CA		
S-04	35.6064	-80.959	Located east of active ash basin, non-flowing AOW in wetland area between basin dike and river bank. Potential sheet flow towards Lake Norman primarily during wet season.	Catawba River (Lake Norman)	WS-IV; B; CA	Instream Monitoring of Lake Norman	

*Location previously investigated as a seep. Monitoring has not indicated the presence of coal combustion residuals.
** Seep dispositioned via repair and/or non-flowing condition to potentially reach WOTUS, or other, as noted.
Monitoring shall be conducted at the approximate locations indicated on the attached site map.
All monitoring shall be conducted per the requirements found in Attachment B of this Order.

Marshall Steam Station – Monitoring Locations



Upstream: Catawba River (Lake Norman)

Instream: Lake Norman – Holdsclaw Creek Arm

Downstream: Catawba River (Lake Norman)

Representative Seep Monitoring

Attachment A
S17-009
Duke Energy Carolinas, LLC – Rogers Energy Complex (Cliffside Steam Station), p.1

Non-Engineered Seeps

Seep ID Number	Approximate Location Coordinates		Description	Receiving Waterbody	Receiving Waterbody Classification	SOC Monitoring Requirements	Interim Action Level
	Latitude	Longitude					
S-01*	35.215639	-81.775344	Steady flow within three foot wide stream located northwest of inactive Unit 5 Ash Basin	Broad River			
S-02	35.217217	-81.768678	Seep drainage in wetland area via 1-2 foot wide stream channel, located north of the inactive Unit 5 ash basin. Drainage collects seep flows from S-18, S-19 and S-19A. Flows north to the Broad River at a point approximately 50 feet downstream of the Inactive Unit 5 Ash Basin discharge outfall.	Unnamed Tributary (UT) to Broad River	WS-IV	Monitoring at established Duke Energy S-02 monitoring site	pH 5-10 s. u. Hardness 800 mg/L Mercury 0.1 µg/L Sulfates 500 mg/L TDS 1000 mg/L Thallium 0.5 µg/L
S-03	35.22001	-81.7577	Minor seepage and groundwater influence from closed Units 1-4 ash basin area to sample point within former condenser circulating water (CCW) discharge canal for retired units 1-4.	Broad River	WS-IV	Broad River Instream Monitoring	
S-05*	35.218147	-81.749844	Diffuse flow emerging from a small area along the bank of the Broad River and base of the active ash basin.	Broad River			
S-07	35.218642	-81.745975	Steady, clear and braided stream that flows in a relatively level area northeast of the active ash basin at edge of property line. Flow is north to Broad River.	UT to Broad River	WS-IV	Monitoring at established Duke Energy S-07 monitoring site	pH 5-10 s. u.
S-08*	35.208547	-81.755781	Natural conveyance tributary to Suck Creek	Suck Creek			
S-09*	35.217122	-81.754244	Minor, diffuse flow to Suck Creek near confluence with Broad River.	Suck Creek			

*Location previously investigated as a seep. Monitoring has not indicated the presence of coal combustion residuals.
** Seep dispositioned via repair and/or non-flowing condition to potentially reach WOTUS, or other, as noted.
Monitoring shall be conducted at the approximate locations indicated on the attached site map.
All monitoring shall be conducted per the requirements found in Attachment B of this Order.

Attachment A
S17-009
Duke Energy Carolinas, LLC – Rogers Energy Complex (Cliffside Steam Station), p.2

Seep ID Number	Approximate Location Coordinates		Description	Receiving Waterbody	Receiving Waterbody Classification	SOC Monitoring Requirements	Interim Action Level
	Latitude	Longitude					
S-10**	35.219472	-81.756731	Seep was located near bank of Broad River, from past toe drains adjacent to Unit 1-4 Inactive Ash Basin. Following ash basin excavation and toe drain removals, seep has disappeared	Broad River			
S-11**	35.2194	-81.756617	Seep was located near bank of Broad River, from past toe drains adjacent to Unit 1-4 Inactive Ash Basin. Following ash basin excavation and toe drain removals, seep has disappeared	Broad River			
S-12*	35.217658	-81.751783	Diffuse seepage to area of wetness (AOW) with no defined channel on bank of Broad River below ash storage area. AOW does not reach surface waters.	Broad River			
S-13**	35.218353	-81.754942	Minor flow was located at bank of Broad River, adjacent to Unit 1-4 Inactive Ash Basin. Following ash basin excavation, seep has disappeared.	Broad River	WS-IV		
S-14	35.214511	-81.755844	Seepage located along toe of dike (west side) of the active ash basin. Area of wetness - no flowing water observed. Any flow would move toward Suck Creek.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-15	35.214297	-81.756117	Second seepage area located along toe of dike (west side) of the active ash basin. Area of wetness - no flowing water observed. Any flow could move via poorly incised channel toward Suck Creek.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-16	35.2141	-81.756208	Third seepage area located along toe of dike (west side) of the active ash basin. Any minor flow could move via channelized area toward Suck Creek.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	

*Location previously investigated as a seep. Monitoring has not indicated the presence of coal combustion residuals.
** Seep dispositioned via repair and/or non-flowing condition to potentially reach WOTUS, or other, as noted.
Monitoring shall be conducted at the approximate locations indicated on the attached site map.
All monitoring shall be conducted per the requirements found in Attachment B of this Order.

Attachment A
S17-009
Duke Energy Carolinas, LLC – Rogers Energy Complex (Cliffside Steam Station), p.3

Seep ID Number	Approximate Location Coordinates		Description	Receiving Waterbody	Receiving Waterbody Classification	SOC Monitoring Requirements	Interim Action Level
	Latitude	Longitude					
S-17**	35.217192	-81.769272	Minor seep at river edge and below the ordinary high water level of Broad River, west (upstream) of S-2.	Broad River			
S-18	35.216439	-81.768564	Seepage from riprap at toe of inactive Unit 5 Ash Basin. Flows north into wetland area draining to sampling site S-2.	UT to Broad River	WS-IV	Monitoring at S-02 monitoring site.	
S-19	35.216361	-81.768681	Seepage from wooded area at toe of inactive Unit 5 Ash Basin. Flows north into wetland area draining to sampling site S-2.	UT to Broad River	WS-IV	Monitoring at S-02 monitoring site.	
S-19A	35.216581	-81.769217	Seepage from wooded area at toe of inactive Unit 5 Ash Basin. Flows north into wetland area draining to sampling site S-2.	Broad River	WS-IV	Monitoring at S-02 monitoring site.	
S-20**	35.215856	-81.765217	Stagnant AOW at toe of northeast side of Inactive Unit 5 Ash Basin. AOW dispositioned via repair.	Broad River	WS-IV		
S-21	35.214625	-81.755953	Seep located along dike of the active ash basin (west side). Area of wetness - no flowing water observed. Any flow would move toward Suck Creek.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-22**	35.218278	-81.748258	Pipe has been plugged; discharge eliminated.				
S-23	35.217994	-81.750208	Seep to pooled area adjacent to the Broad River, located north of the active ash basin. Minor seepage from pool emerges with any flow draining north to the Broad River.	Broad River	WS-IV	Broad River Instream Monitoring	
S-24*	35.218139	-81.749428	Minor seepage to AOW near bank of Broad River and north of active basin.	Broad River			

*Location previously investigated as a seep. Monitoring has not indicated the presence of coal combustion residuals.
** Seep dispositioned via repair and/or non-flowing condition to potentially reach WOTUS, or other, as noted.
Monitoring shall be conducted at the approximate locations indicated on the attached site map.
All monitoring shall be conducted per the requirements found in Attachment B of this Order.

Attachment A
S17-009
Duke Energy Carolinas, LLC – Rogers Energy Complex (Cliffside Steam Station), p.4

Seep ID Number	Approximate Location Coordinates		Description	Receiving Waterbody	Receiving Waterbody Classification	SOC Monitoring Requirements	Interim Action Level
	Latitude	Longitude					
S-25**	35.217689	-81.751894	Minor seepage to AOW below ash storage area. No measurable flow has been observed throughout site history.	Broad River			
S-26*	35.217425	-81.753931	Natural conveyance near bank of Suck Creek near confluence with the Broad River.	Suck Creek			
S-27	35.21383	-81.756478	Seep located along dike of the active ash basin (west side). Area of wetness - no flowing water observed. Any flow would move toward Suck Creek.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-28	35.211677	-81.753876	Minor diffuse groundwater seepage along steep bank of Suck Creek, west of the active ash basin dike.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-29	35.211542	-81.753993	Minor diffuse groundwater seepage along steep bank of Suck Creek, west of the active ash basin dike.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-30	35.211496	-81.75391	Minor diffuse groundwater seepage along steep bank of Suck Creek, west of the active ash basin dike.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-31	35.211482	-81.753887	Minor diffuse groundwater seepage along steep bank of Suck Creek, west of the active ash basin dike.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-32	35.211258	-81.753646	Minor diffuse groundwater seepage along steep bank of Suck Creek, west of the active ash basin dike.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	
S-33**	35.218272	-81.754754	Seep was located at bank of Broad River, adjacent to Unit 1-4 Inactive Ash Basin. Following ash basin excavation, seep has disappeared	Broad River			
S-34*	35.217556	-81.753725	Natural conveyance near bank of Suck Creek	Suck Creek			
S-35*	35.208203	-81.755703	Natural conveyance tributary to Suck Creek	Suck Creek			

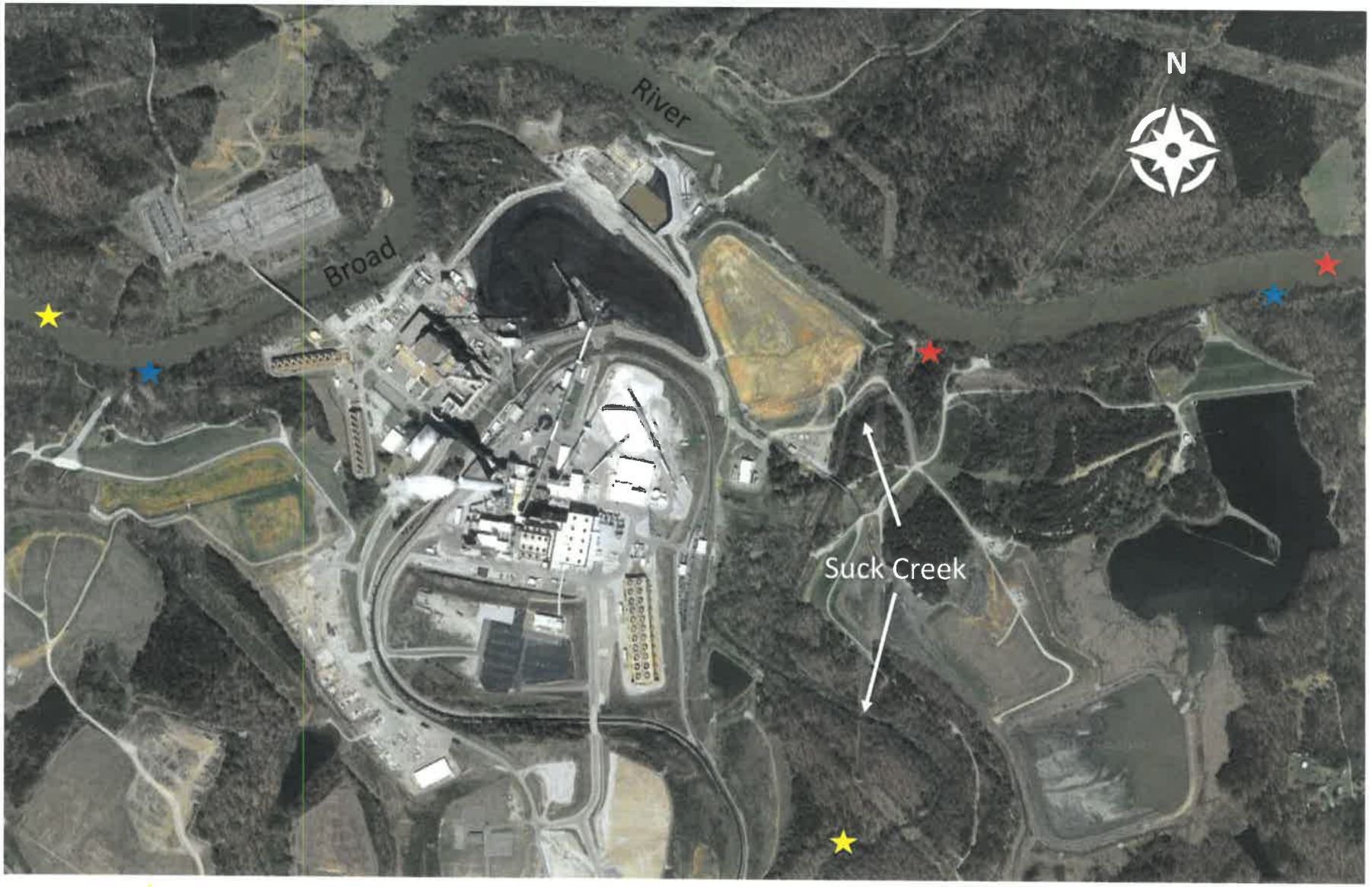
*Location previously investigated as a seep. Monitoring has not indicated the presence of coal combustion residuals.
** Seep dispositioned via repair and/or non-flowing condition to potentially reach WOTUS, or other, as noted.
Monitoring shall be conducted at the approximate locations indicated on the attached site map.
All monitoring shall be conducted per the requirements found in Attachment B of this Order.

Attachment A
S17-009
Duke Energy Carolinas, LLC – Rogers Energy Complex (Cliffside Steam Station), p.5

Seep ID Number	Approximate Location Coordinates		Description	Receiving Waterbody	Receiving Waterbody Classification	SOC Monitoring Requirements	Interim Action Level
	Latitude	Longitude					
S-36	35.210258	-81.753983	Minor diffuse groundwater seepage along bank of Suck Creek, west of the active ash basin dike. New area identified with no current data. Area to be monitored to determine status.	Suck Creek	WS-IV	Suck Creek Instream Monitoring	

*Location previously investigated as a seep. Monitoring has not indicated the presence of coal combustion residuals.
** Seep dispositioned via repair and/or non-flowing condition to potentially reach WOTUS, or other, as noted.
Monitoring shall be conducted at the approximate locations indicated on the attached site map.
All monitoring shall be conducted per the requirements found in Attachment B of this Order.

Rogers Energy Complex (Cliffside Steam Station) – Monitoring Locations



★ Upstream in Broad River and Suck Creek

★ Downstream in Broad River and Suck Creek

★ Representative Seep Monitoring

SOC S17-009
Duke Energy Carolinas, LLC
Attachment B
Monitoring Requirements

The following represents the parameters to be analyzed and reported at all monitoring locations designated within this Special Order.

Parameter	Reporting Units	Monitoring Frequency
TSS	mg/L	Annually
Oil and Grease	mg/L	Annually
pH	Standard Units (s. u.)	Quarterly
Fluoride	µg/L	Quarterly
Total Mercury	ng/L	Quarterly
Total Barium	µg/L	Quarterly
Total Zinc	µg/L	Quarterly
Total Arsenic	µg/L	Quarterly
Total Boron	µg/L	Quarterly
Total Cadmium	µg/L	Quarterly
Total Chromium	µg/L	Quarterly
Total Copper	µg/L	Quarterly
Total Thallium	µg/L	Quarterly
Total Lead	µg/L	Quarterly
Total Nickel	µg/L	Quarterly
Total Selenium	µg/L	Quarterly
Nitrate/Nitrite as N	mg/L	Quarterly
Sulfates	mg/L	Quarterly
Chlorides	mg/L	Quarterly
TDS	mg/L	Quarterly
Total Hardness	mg/L	Quarterly
Temperature	° C	Quarterly
Conductivity, µmho/cm	µmho/cm	Quarterly